

DNS RESOLVER

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The System:

The java classes are:

DNS_resolver : The main class to run iteration that handles the logical operations such as sending queries, time-outs, message printing.

ResponseAnalyzer : This class handles a single response Datagram Packet, parses the contents, prepares status and formats the output message formatting.

QueryBuilder : This class builds a DNS Query.

DNSClass : This class handles the response classes i.e. IN, CS, CH.

DNSRecordType : This class handles the record Types i.e. A, NS, AAAA.

The Process:

At first DNS_resolver class takes user input(domain) and builds a query message using the QueryBuilder class. Then it sends the query message to the root domain server. After that it receives a response or throws a time-out message in case of time-outs. Then in the scenario of a successful response retrieval it parses the response packet using the ResponseAnalyzer class with the help of DNSClass and DNSRecordType classes. Then according to the response status from the response analyzer class it either runs iterative queries or prints the response message in the console.

Design Tradeoffs:

We tried to make the whole system modular as much as possible. We tried to make the system more efficient. We stored some compression results trading more space over time. We considered a 5 second time-out for a single query.

Suggested Improvements: This project could be made more modular. For example the ResponseAnalyzer class was a little lengthy. We could have optimized the whole system for the common parts using static{} blocks.

Important Conditions:

- Depending on the network connection speed and iterations, the output generation may take 15-20 seconds
- It is best to use full address of a domain (e.g: www.mit.edu) as for some CNAME inputs, the code may not give desired output if full address is not used.

References:

1. <https://stackoverflow.com/questions/36743226/java-send-udp-packet-to-dns-server>
DNS query builder class was made using this model. 15% code of the whole system was implemented using this code.
2. <http://www.vbforums.com/showthread.php?846577-VB6-ClientDNS>
Byte level compression problem was planned after learning from this source.